

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-002847

(43)Date of publication of application : 09.01.1996

(51)Int.Cl.

B66B 5/02

(21)Application number : 06-140401

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(22)Date of filing : 22.06.1994

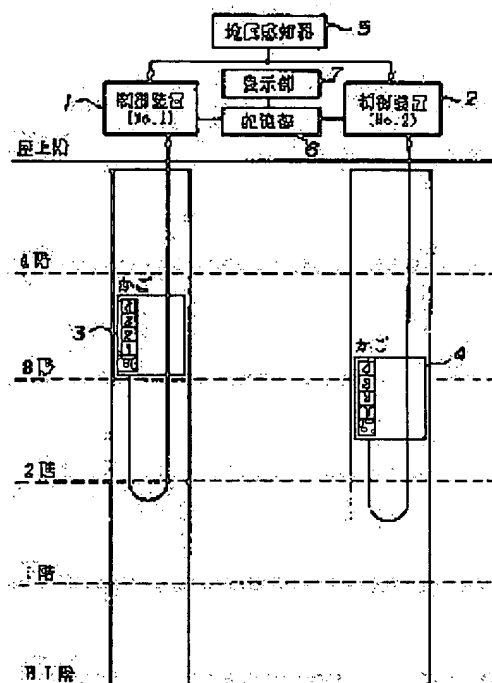
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(54) OPERATION CONTROL DEVICE FOR ELEVATOR

(57)Abstract:

PURPOSE: To provide an elevator operation control device capable of storing the result of low-speed automatic operation implemented after the occurrence of an earthquake, and allowing a maintenance person to confirm the result of his/her check.

CONSTITUTION: An elevator is equipped with main control devices 1 and 2 to control the operation of a car as well as a vibration sensor 5 to detect a vibration, and the devices 1 and 2 perform a low-speed automatic operation for detecting the condition of the elevator when the sensor 5 detects the occurrence of a vibration equal to or above the preset level. Regarding this elevator, a judgement section is provided for making judgement as to whether the low-speed automatic operation should be continued, depending on the abnormal state of the elevator detected at the time of the operation, together with a memory section 6 for storing the result of the low-speed automatic operation.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the
examiner's decision of rejection or application converted
registration]

[Date of final disposal for application]

[Patent number]

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[Number of appeal against examiner's decision of
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CLAIMS

[Claim(s)]

[Claim 1] The control device of the elevator in which the aforementioned main control unit will perform low-speed unattended operation for checking the state of an elevator if it has the main control unit which manages the operation control of at least one or more sets of the cages characterized by providing the following, and the sway sensor which detects vibration and generating of vibration more than predetermined level is detected by the aforementioned sway sensor The judgment section which judges whether low-speed unattended operation is continued by the abnormal condition of the elevator detected during low-speed unattended operation The storage section which memorizes the result of the aforementioned low-speed unattended operation

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the control device of an elevator.

[0002]

[Description of the Prior Art] In the conventional elevator, the control unit with which they made the subject the microcomputer which manages system-wide control when sway sensors, such as an acceleration sensor, detected the level near the minimum of a severe earthquake stops operation of a cage, and waits for check of the elevator which contains a cage in this state.

[0003] Moreover, if low-speed unattended operation is performed and there are no abnormalities as a result at the time of the occurrence of an earthquake as the official report is carried out to JP,5-170387,A, a cage will be stopped on a criteria story, and on the other hand, if abnormalities are detected during low-speed unattended operation, a cage will be stopped on that spot and it will wait for check of an elevator.

[0004]

[Problem(s) to be Solved by the Invention] Although low-speed unattended operation was interrupted and the cage was stopped on that spot when an earthquake occurred, low-speed unattended operation is performed and abnormalities were detected as a result, as explained above In this case, since the above content is not memorized [which came to interrupt low-speed unattended operation] when the customer engineer of an elevator comes for check later, it must perform that it is the same as that of the check again carried out with low-speed unattended operation to discover an unusual part, and check will take a long time. moreover, having carried out low-speed automatic checking how far -- since it is unknown, there is a possibility of checking again to the part which was normal as a result of low-speed unattended operation

[0005] Therefore, the check after the occurrence of an earthquake will become a long time, and requires considerable time further in the center of Tokyo for there being also much number of an elevator, having to check the elevator of the many number by one person's customer engineer, and checking all elevators. However, I have the elevator which has stopped immediately checked and want to return normally for those who are using the elevator.

[0006] The purpose of this invention is to offer the control device of an elevator which can check the check result, when the result of the low-speed unattended operation carried out after the occurrence of an earthquake is memorized and a customer engineer comes for check.

[0007]

[Means for Solving the Problem] The main control unit with which this invention manages the operation control of at least one or more sets of cages in order to attain the above-mentioned purpose, If it has the sway sensor which detects vibration and generating of vibration more than predetermined level is detected by the aforementioned sway sensor In the control device of the elevator in which the aforementioned main control unit performs low-speed unattended operation for checking the state of an elevator It considers as the composition which prepared the judgment section which judges whether low-speed unattended operation is continued by the abnormal condition of the elevator detected during low-speed unattended operation, and the storage section which memorizes the result of the aforementioned low-speed unattended operation.

[0008]

[Function] Since it considered as such composition, with the low-speed unattended operation carried out by the instructions from the control unit of an elevator after the occurrence of an earthquake Since the existence of the abnormalities of each device of an elevator is detected, and it judges whether the judgment section continues low-speed unattended operation by the degree of the abnormality and all the results of low-speed unattended operation are memorized by the storage section Since what is necessary is to check only the part which did not do an injury to the

device of an elevator with low-speed unattended operation, and a customer engineer has not checked with low-speed unattended operation, while being able to shorten check time, the un-movable time of the elevator by the earthquake can be shortened.

[0009]

[Example] Hereafter, one example of this invention is explained with reference to drawing 1 , drawing 2 , and drawing 3 . Explanatory drawing showing the outline of the elevator which drawing 1 requires for an example here, the flow chart with which drawing 2 shows operation of an example, and drawing 3 are the examples of the check result of low-speed unattended operation.

[0010] To be shown in drawing 1 , 1 is the 1st control unit, 2 is the 2nd control unit, and operation of the 1st cage 3 and the 2nd cage 4 to this is controlled respectively.

[0011] The 1st passes through the information from the hoistway corresponding to the 1st cage 3 and this cage 3 control unit 1, and the information from the hoistway corresponding to the 2nd cage 4 and this cage 4 is outputted to the 2nd control unit 2, respectively.

[0012] 5 is an earthquake sensor, for example, consists of sway sensors, such as an acceleration sensor, and is arranged near the above 1st and the 2nd control unit 1 and 2. And the detection information on this earthquake sensor 5 is supplied to the 1st and the 2nd control unit 1 and 2, and a vibration level is recognized.

[0013] 6 is the storage section and the result of the low-speed unattended operation carried out by the aforementioned cost 1 and the 2nd control unit 1 and 2 is memorized. The example of the check result is shown in drawing 3 . In this example, normality and the halt position of the cage of the first floor of the switching condition of normality and the door of the second floor are [the switching condition of the door of the first floor] unusual, the reason is that opening-and-closing time took 5 seconds, the halt position of the cage of the second floor is unusual, and it is shown that the reason is shifted 30mm. Moreover, it means that a door stops having closed and low-speed diagnostic operation was interrupted during the opening and closing of a door of the ninth floor. Furthermore, having not carried out check of the switching condition of the door of the ninth floor and check of the halt position of the cage of the ninth floor is shown.

[0014] As for 7, the contents of the aforementioned storage section 6 are displayed by the display.

[0015] The door (not shown) of each story is opened and closed by the above 1st and the instructions from the 2nd control unit 1 and 2.

[0016] The above 1st and the 2nd control unit 1 and 2 are constituted considering a microcomputer as a subject, by the various programs created beforehand, perform various processings and perform motion control as follows at the time of the occurrence of an earthquake.

[0017] Operation of the example of such composition is explained with reference to the flow chart shown in drawing 2 .

[0018] If an earthquake occurs, the measurement information from the aforementioned earthquake sensor 5 will be sent out to the 1st and the 2nd control unit 1 and 2, and the vibration level will be judged. And if it is the 1st less than level, if it is judged at Step S1 whether a vibration level is the 1st more than level set up beforehand and it is the 1st more than level, it progresses to Step S2, and it progresses to Step S11, and usual operation is continued. At Step S2, the cages 3 or 4 of an elevator are judged in under a run, and if it is [be / it] under run, if it progressed to back step S4 which the nearby story was made to stop and has stopped at Step S3, it will progress to step S4.

[0019] The 2nd level to which the cage vibration level was beforehand set in step S4 (level higher than the 1st level.) For example, if it is the 2nd more than level, if it is the 2nd less than level, it will be judged whether if the 1st level is 80gal, the 2nd level is more than 120gal, it will progress to Step S5, and after predetermined-time progress, an automatic reset will be carried out and usual operation will be continued [it progresses to Step S41, and] at Step S42. The 3rd level to which the cage vibration level was beforehand set at Step S5 (level higher than the 2nd level.) For example, it is judged whether if the 2nd level is 120gal, the 3rd level is more than 150gal, and if it is the 3rd more than level, it will progress to Step S6, and if it is the 3rd less than level, progresses to Step S51.

[0020] At Step S51, the check result is memorized in the storage section 6, performing low-speed unattended operation and checking the state of an elevator. It is whether the switching condition of a door of the content of a check is normal, or the halt position of a cage is normal, and these are checked automatically and a check result is memorized in the storage section 6. At Step S52, control units 1 and 2 judge whether the abnormalities of the elevator which cannot continue low-speed unattended operation were detected. The state of the elevator which cannot continue low-speed unattended operation is the case where neither the case where the cage has separated from the rail, nor a door opens and closes etc. When the abnormalities of the elevator which cannot continue low-speed unattended operation are detected, the result by the place which carried out low-speed unattended operation is memorized, and the reason which cannot continue is also memorized, and it progresses to Step S54. At Step S53, control units 1 and 2 judge whether

low-speed unattended operation was completed. When it ends, it progresses to Step S54. An elevator is stopped at Step S54. At Step S55, the content of a display of a display 7 is seen and a customer engineer checks.

[0021] At Step S6, an elevator is stopped and it stops.

[0022] Thus, in this example, since low-speed operation is performed automatically in advance, the state of an elevator is grasped and it memorizes when an earthquake occurs and a customer engineer checks there That The part, [the part which a customer engineer looks at the memorized result, and is not carrying out an unusual part and low-speed operation] the part which furthermore cannot be checked with low-speed unattended operation, for example, the column of an elevator, -- what is necessary is just to check whether the foreign matter has fallen on the inner floor, or the foreign matter has not fallen on the floor of the machine room of an elevator Therefore, since it is not necessary to check a normal part as a result of carrying out low-speed unattended operation, it is effective in the ability to shorten check time.

[0023] Moreover, in this example, although the direct file of the display 7 was carried out to the storage section 6, when required, a customer engineer may connect maintenance tools, such as a personal computer, and it may display and look at the content of storage of the storage section 6. Furthermore, it may connect within an elevator lobby or a cage, and the above-mentioned maintenance tool may display and look at the content of storage.

[0024]

[Effect of the Invention] In this invention, with the low-speed unattended operation carried out by the instructions from the control unit of an elevator after the occurrence of an earthquake Since the existence of the abnormalities of each device of an elevator is detected, and it judges whether the judgment section continues low-speed unattended operation by the degree of the abnormality and all the results of low-speed unattended operation are memorized by the storage section It is effective in the ability to shorten the un-movable time of the elevator by the earthquake by not doing an injury to the device of an elevator with low-speed unattended operation, while it can shorten check time, since a customer engineer should check only the part which has not been checked with low-speed unattended operation.

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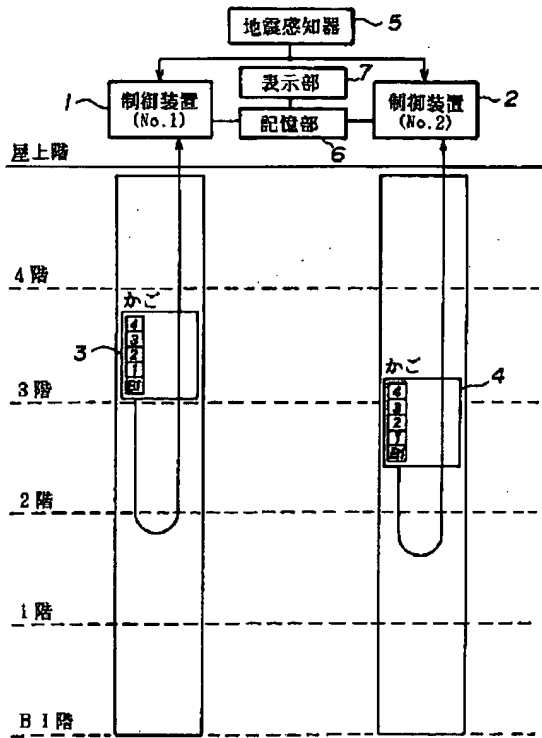
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DRAWINGS



[Drawing 1]

【図 1】



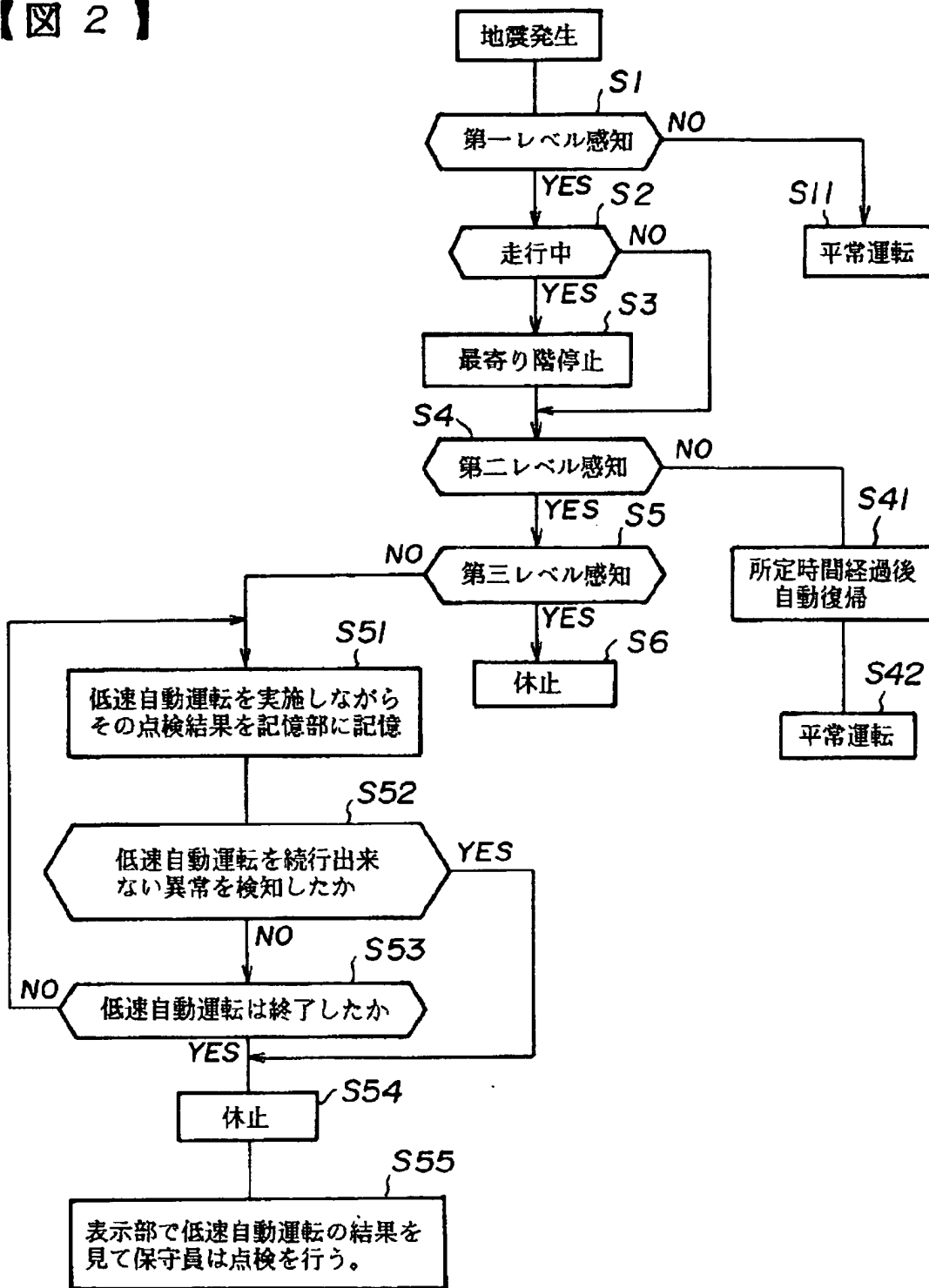
[Drawing 3]

【図 3】

| 点 検 個 所 | 点 検 結 果 |
|---|---|
| 1 階のドアの開閉状態 | 正常 |
| 1 階のかごの停止位置 | 正常 |
| 2 階のドアの開閉状態 | 異常 (開閉時間 5 秒) |
| 2 階のかごの停止位置 | 異常 (+ 3 0 mm) |
|  |  |
| 8 階のドアの開閉状態 | 正常 |
| 8 階のかごの停止位置 | 正常 |
| 低速自動運転 | 中断 (9 階のドアが開まらず) |
| 9 階のドアの開閉状態 | 未実施 |
| 9 階のかごの停止位置 | 未実施 |

[Drawing 2]

【図 2】



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